# Poverty Mapping using Clustering

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## Aim of the Project

The aim of the project is to use data mining technique viz clustering for poverty mapping based on Schedule 63_1.0 consumer expenditure of Socio Economic Survey Sixty third round (July 2006 – June 2007) (Report of NSS) . The main focus is to find the percentage of people below poverty line. Further it has been analyzed as to which community is poorest in different states. This will help the Government to take necessary steps to alleviate poverty in different states and try to uplift the community which is below poverty line in majority of states.
Data used
Socio Economic Survey Sixty third round (July 2006 – June 2007)

## Data Mining technique used

For poverty mapping, clustering technique which is a popular unsupervised learning technique has been used. Details of clustering are given below:

### Clustering

Clustering is a data mining task used to cluster observations into groups of related observations without any prior knowledge of those relationships. The k-means algorithm is one of the popular clustering techniques and it is commonly used in variety of applications.

### k-means Algorithm

The k-means algorithm is an evolutionary algorithm that gains its name from its method of operation. The algorithm clusters observations into k groups, where k is provided as an input parameter. It then assigns each observation to clusters based upon the observation's proximity to the mean of the cluster. The cluster's mean is then recomputed and the process begins again. Here's The algorithm works as follows:
Each point in the dataset is assigned to the closed cluster, based on the Euclidean distance between each point and each cluster center. Each cluster center is recomputed as the average of the points in that cluster.
The above steps are repeated until the clusters converge.
It is often a good idea to experiment with different values of k to identify the value that best suits your data. You also may wish to explore the use of other data mining algorithms in your quest for machine-learned knowledge. For the present study, K=12 was found to be optimum to find the people below poverty line. The results are given below for the year 2006-2007 and has been compared with the published results of 2003-2004

**Comparison of the results of 2006-07 with 2003-2004**

In the year 2003-04, in the state of Andhra Pradesh, 11.1% were below poverty line where in 2006-07, 13.62% belong to the poorer section and their per capita consumer expenditure is RS3788. For the state of Arunachal Pradesh in the year 2003-04, 13.4% were below poverty line, however it is observed that in the year 2006-07, there had been a decrease in the % of poor people's it only 6.24% and their per capita consumer expenditure is RS3620.

For the state of Assam, percentage of poor people gone up 2003-04, only 15% were below poverty line. Whereas in 2006-07 23.7% were poor and their per capita income is RS3347.

For the state of Bihar it is interesting to see in the year 2003-04, 32.5% were below poverty line, however in 2006-07 only 15.1% are poor with the per capita income of RS2633.

Decrease in poverty is observed in the following states in the year 2006-07 in compression to 2003-04.

**Table 1  Comparison of percentage of people below poverty line in different states (where there has been decrease in poverty) from 2003-2004 to 2006-2007**

| Name of State | 2003-04 BPL | %Poor people | 2006-07 Per Capita Income |
|---|---|---|---|
| Chhattisgarh | 32 | 26.3 | 3403 |
| Delhi | 10.2 | 2.9 | 4170 |
| Gujarat | 12.5 | 7.2 | 5640 |
| Haryana | 9.9 | 6.7 | 3611 |
| Jharkhand | 34.8 | 13.6 | 2197 |
| Karnataka | 17.4 | 3.7 | 3031 |
| Kerala | 11.4 | 9.8 | 6514 |
| MP | 32.4 | 10.3 | 2718 |
| Maharashtra | 25.2 | 4.6 | 4944 |
| Orissa | 39.9 | 7.9 | 2464 |
| Rajasthan | 17.5 | 12.2 | 3518 |
| Tamilnadu | 17.8 | 12.1 | 4131 |
| Tripura | 14.4 | 11.5 | 2628 |
| UP | 35.5 | 8.1 | 3186 |
| Utharakhand | 31.8 | 10.4 | 2164 |
| WB | 20.6 | 10.4 | 3402 |
| Andaman Nikobar | 17.6 | 3.6 | 4899 |
| Dadar & Nagar | 30.6 | 10.7 | 4877 |
| Daman & Due | 8 | 6.7 | 4126 |
| Lakshadweep | 12.3 | 6.3 | 3074 |

| | | | |
|---|---|---|---|
| Goa | 12 | 3.1 | 4244 |
| Manipur | 13.2 | 10.3 | 3312 |
| Mizoram | 9.5 | 6.6 | 6302 |
| Sikkim | 15.2 | 7.5 | 4860 |
| Pondicherry | 18.2 | 15.3 | 4807 |

However there has been increase in the % of poor people in the year 2006-07 in comparison to 2003-04 in the following states.

**Table 2  Comparison of percentage of people below poverty line in different states (where there has been increase in poverty) from  2003-2004 to 2006-2007**

| | 2003-04 | 2006-07 | |
|---|---|---|---|
| Name of State | BPL | %Poor people | Per Capita Income |
| Himachal Pradesh | 6.7 | 12.7 | 4490 |
| Meghalaya | 14.1 | 16.9 | 3730 |
| Nagaland | 14.5 | 19.8 | 5296 |
| Punjab | 5.2 | 10.7 | 6254 |
| Chandigarh | 3.8 | 5 | 4335 |
| J&K | 4.2 | 6.2 | 4910 |

## Description of  data

The data collected corresponds to the Consumer Expenditure, and is divided into seven different levels:

1) Level – 01 (Location details)

- Sample
- Sector
- State-Region
- District
- Stratum Number
- Sub-Stratum
- Sub-Round
- Sub-Sample
- FOD Sub-Region
- Segment Number
- Second Stage Stratum
- HHS No.
- Sl.No. of informant
- Response Code
- Survey Code
- Substitution Code

- Date of Survey
- Date of Despatch
- Time to canvass(mins.)

2) Level – 02 (Family Details)

- HH Size
- NIC Code(5-digit)
- NCO Code(3-digit)
- HH type
- Religion
- Social Group
- Land possessed code
- Dwelling unit code
- Type of dwelling code
- Type of structure
- Covered area(sq. m)
- Cooking code
- Lighting code
- MPCE
- Perform any ceremony-last 30 day
- Meals seved to non-hhld members
- Purchase any cereal from ration

3) Level – 03 (Individual detail)

- Person Srl No.
- Relation
- Sex
- Age
- Marital Status
- General Education
- Days Stayed away
- No. of Meals per day
- Meals (School)
- Meals (Employer)
- Meals (Others)
- Meals (Payment)
- Meals(At Home)
- Got work in Public works
- No.of days got work
- Total wages- Cash
- Total wages- Kind

- Total wages- Total
- Complaint to authority
- Whether received compensation?
- Amount of compensation

4) Level – 04 (Expenditure on food items)

- Item Code
- Quantity(0.000)
- Value(Rs. in whole no.)
- Source

5) Level – 05 (Expenditure on clothing and footwear)

- Item Code
- Quantity(0.000) / No.of pairs(whole no.)
- Value(Rs. in whole no.)

6) Level – 06 (Expenditure on miscellaneous goods including education, medical, rent, taxes etc)

- Item Code
- Value

7) Level – 07 (Expenditure on durable goods)

- Item Code
- No. in use on the date of survey
- First-hand purchase:Number
- Whether hirepurchased?
- First-hand purchase:Value
- Cost-raw material,service & repair
- 2nd-hand purchase:Number
- 2nd-hand purchase:Value
- Total expenditure

The data contains around 63 thousand samples spread all over India.

## Extraction of Data

The data was extracted from the compressed format to a CSV format. Only the relevant fields were extracted. K means clustering algorithm was employed
Description of poverty in States

Note :- (1) If no descriptions is available of any religion in any state, it means no
information provided in dataset about that religion.
(2) If no description is available of any religion in any state category, it means no
Person from that religion is present

The detailed results of clustering are given below for all the states and it has been split
according to religion. The State codes and their corresponding names are given in Table 3

**Table 3**

| Code | State_Name |
|------|------------|
| 1 | Jammu & Kashmir |
| 2 | Himachal Pradesh |
| 3 | Punjab |
| 4 | Chandigarh |
| 5 | Uttaranchal |
| 6 | Haryana |
| 7 | Delhi |
| 8 | Rajasthan |
| 9 | Uttar Pradesh |
| 10 | Bihar |
| 11 | Sikkim |
| 12 | Arunachal Pradesh |
| 13 | Nagaland |
| 14 | Manipur |
| 15 | Mizoram |
| 16 | Tripura |
| 17 | Meghalaya |
| 18 | Assam |
| 19 | West bengal |
| 20 | Jharkhand |
| 21 | Orissa |
| 22 | Chhattisgarh |
| 23 | Madhya Pradesh |
| 24 | Gujarat |
| 25 | Daman & Diu |
| 27 | Maharashtra |
| 28 | Andhra Pradesh |
| 29 | Karnataka |
| 30 | Goa |
| 31 | Lakshadweep |
| 32 | Kerala |
| 33 | Tamil Nadu |
| 34 | Pondicherry |
| 35 | Andaman and Nicobar |

In State -1 total of 1118 people, out of which
- 918 people are poor class having average exp. 33186.55,
  - ➢ 79.53% Hindu out of 430,
  - ➢ 84.38% Islam out of 653,
  - ➢ 100% Christianity out of 1,
  - ➢ 70.97% Sikhism out of 31,
  - ➢ 66.67% Others out of 3,

- 183 people are middle class having average exp. 105169.28,
  - ➢ 18.84% Hindu out of 430,
  - ➢ 14.40% Islam out of  653,
  - ➢ 25.81% Sikhism out of 31,

- 17 people are upper class having average exp. 251275.29,
  - ➢ 1.63% Hindu out of 430,
  - ➢ 1.23% Islam out of 653,
  - ➢ 3.23% Sikhism out of 31,
  - ➢ 33.33% Others out of 3

In State -2 total of 1196 people, out of which
- 1160 people are poor class having average exp. 34234.43,
  - ➢ 97.21% Hindu out of 1112,
  - ➢ 92.31% Islam out of 26,
  - ➢ 100% Christianity out of 1,
  - ➢ 90.00% Sikhism out of 20,
  - ➢ 96.97% Buddhism out of 33,
  - ➢ 100% Others out of 2,

- 34 people are middle class having average exp. 239091.91,
  - ➢ 2.70% Hindu out of 1112,
  - ➢ 7.69% Islam out of 26,
  - ➢ 5.00% Sikhism out of 20,
  - ➢ 3.03% Buddhism out of 33,

- 2 people are upper class having average exp. 1151924.00,
  - ➢ 0.09% Hindu out of 1112,
  - ➢ 5.00% Buddhism out of 33,

In State -3 total of 1584 people, out of which
- 1543 people are poor class having average exp. 52301.85,
  - ➢ 98.29% Hindu out of 761,

- ➢ 100% Islam out of 30,
- ➢ 100% Christianity out of 7,
- ➢ 96.41% Sikhism out of 780,
- ➢ 100% Jainism out of 4,
- ➢ 100% Others out of 2,

- • 37 people are middle class having average exp.  395134.41,
  - ➢ 1.58% Hindu out of 761,
  - ➢ 3.21% Sikhism out of 780,

- • 4 people are upper class having average exp.  1485678.00,
  - ➢ 0.13% Hindu out of 761,
  - ➢ 0.38% Sikhism out of 780,

In State -4 total of 182 people, out of which
- • 123 people are poor class having average exp.  22825.45,
  - ➢ 70.71% Hindu out of 140,
  - ➢ 83.33% Islam out of 6,
  - ➢ 66.67% Christianity out of 3,
  - ➢ 50.00% Sikhism out of 32,
  - ➢ 100% Others out of 1,

- • 40 people are middle class having average exp.  84998.58,
  - ➢ 22.14% Hindu out of 140,
  - ➢ 16.67% Islam out of 6,
  - ➢ 33.33% Christianity out of 3,
  - ➢ 21.88% Sikhism out of 32,

- • 19 people are upper class having average exp.  204871.26,
  - ➢ 7.14% Hindu out of 140,
  - ➢ 28.13% Sikhism out of 32,

In State -5 total of 616 people, out of which
- • 594 people are poor class having average exp.  28163.86,
  - ➢ 96.52% Hindu out of 546,
  - ➢ 96.72% Islam out of 61,
  - ➢ 100% Christianity out of 3,
  - ➢ 100% Sikhism out of 5,

- • 20 people are middle class having average exp.  147610.30,
  - ➢ 3.11% Hindu out of 546,
  - ➢ 3.28% Islam out of 61,
  - ➢ 100% Jainism out of 1,

- 2 people are upper class having average exp. 804599.00,
  - ➢ 0.37% Hindu out of 546,


In State -6 total of 1321 people, out of which
- 1143 people are poor class having average exp. 34156.23,
  - ➢ 86.19% Hindu out of 1195,
  - ➢ 98.00% Islam out of 50,
  - ➢ 100% Christianity out of 4,
  - ➢ 85.29% Sikhism out of 68,
  - ➢ 33.33% Jainism out of 3,
  - ➢ 100% Others out of 1,

- 157 people are middle class having average exp. 149311.94,
  - ➢ 12.13% Hindu out of 1195,
  - ➢ 2.00% Islam out of 50,
  - ➢ 21.88% Sikhism out of 68,
  - ➢ 66.67% Jainism out of 3,

- 21 people are upper class having average exp. 371796.05,
  - ➢ 1.67% Hindu out of 1195,
  - ➢ 1.47% Sikhism out of 68,


In State -7 total of 1616 people, out of which
- 1203 people are poor class having average exp. 25688.26,
  - ➢ 74.41% Hindu out of 1387,
  - ➢ 84.62% Islam out of 130,
  - ➢ 58.33% Christianity out of 12,
  - ➢ 64.38% Sikhism out of 73,
  - ➢ 50% Others out of 4,

- 346 people are middle class having average exp. 103935.34,
  - ➢ 21.56% Hindu out of 1387,
  - ➢ 13.08% Islam out of 130,
  - ➢ 41.67% Christianity out of 12,
  - ➢ 28.77% Sikhism out of 73,
  - ➢ 11.11% Jainism out of 9,
  - ➢ 100% Buddhism out of 1,
  - ➢ 50% Others out of 4,

- 67 people are upper class having average exp. 228903.79,
  - ➢ 4.04% Hindu out of 1387,
  - ➢ 2.31% Islam out of 130,
  - ➢ 6.85% Sikhism out of 73,
  - ➢ 33.33% Jainism out of 9,

In State -8 total of 2956 people, out of which
- 2873 people are poor class having average exp. 28040.04,
  - ➢ 97.24% Hindu out of 2573,
  - ➢ 99.33% Islam out of 299,
  - ➢ 85.71% Sikhism out of 28,
  - ➢ 88.46% Jainism out of 52,
  - ➢ 100% Others out of 4,

- 40 people are middle class having average exp. 203118.65,
  - ➢ 1.36% Hindu out of 2573,
  - ➢ 7.14% Sikhism out of 28,
  - ➢ 5.77% Jainism out of 52,

- 43 people are upper class having average exp. 293448.78,
  - ➢ 1.40% Hindu out of 2573,
  - ➢ 0.67% Islam out of 299,
  - ➢ 7.14% Sikhism out of 28,
  - ➢ 5.77% Jainism out of 52,


In State -9 total of 5195 people, out of which
- 4801 people are poor class having average exp. 26789.48,
  - ➢ 91.82% Hindu out of 4047,
  - ➢ 95.39% Islam out of 1063,
  - ➢ 86.36% Christianity out of 22,
  - ➢ 76.92% Sikhism out of 39,
  - ➢ 93.75% Jainism out of 16,
  - ➢ 87.50% Others out of 8,

- 314 people are middle class having average exp. 120771.39,
  - ➢ 6.62% Hindu out of 4047,
  - ➢ 3.20% Islam out of 1063,
  - ➢ 13.64% Christianity out of 22,
  - ➢ 17.95% Sikhism out of 39,
  - ➢ 6.25% Jainism out of 16,
  - ➢ 12.50% Others out of 8,

- 80 people are upper class having average exp. 225972.53,
  - ➢ 1.56% Hindu out of 4047,
  - ➢ 1.41% Islam out of 1063,
  - ➢ 5.13% Sikhism out of 39,

In State -10 total of 2422 people, out of which
- 2185 people are poor class having average exp. 18297.66,

- ➢ 90.31% Hindu out of 2125,
- ➢ 90.75% Islam out of 285,
- ➢ 100% Christianity out of 5,
- ➢ 66.67% Jainism out of 6,
- ➢ 100% Buddhism out of 1
- ➢ 100% Others out of 1,

- • 227 people are middle class having average exp. 69879.20,
  - ➢ 9.27% Hindu out of 2125,
  - ➢ 8.90% Islam out of 285,
  - ➢ 100% Sikhism out of 3,

- • 10 people are upper class having average exp. 184592.50,
  - ➢ 0.42% Hindu out of 2125,
  - ➢ 0.36% Islam out of 285,

In State -11 total of 256 people, out of which
- • 218 people are poor class having average exp. 19509.37,
  - ➢ 82.53% Hindu out of 166,
  - ➢ 100% Islam out of 4,
  - ➢ 85.71% Christianity out of 14,
  - ➢ 91.55% Buddhism out of 71,

- • 35 people are middle class having average exp. 67747.29,
  - ➢ 16.27% Hindu out of 166,
  - ➢ 7.14% Christianity out of 14,
  - ➢ 100% Jainism out of 1,
  - ➢ 8.45% Buddhism out of 71,

- • 3 people are upper class having average exp. 173375.67,
  - ➢ 1.20% Hindu out of 166,
  - ➢ 7.14% Christianity out of 71,

In State -12 total of 571 people, out of which
- • 557 people are poor class having average exp. 26785.42,
  - ➢ 97.99% Hindu out of 199,
  - ➢ 100% Islam out of 12,
  - ➢ 98.90% Christianity out of 91,
  - ➢ 100% Buddhism out of 85,
  - ➢ 95.11% Others out of 184,

- • 12 people are middle class having average exp. 188676.42,
  - ➢ 1.51% Hindu out of 199,
  - ➢ 1.10% Christianity out of 91,
  - ➢ 4.35% Others out of 184,

- 2 people are upper class having average exp. 781289.00,
  - 0.50% Hindu out of 199,
  - 0.54% Others out of 184,

In State -13 total of 452 people, out of which
- 314 people are poor class having average exp. 33047.95,
  - 81.63% Hindu out of 49,
  - 75% Islam out of 8,
  - 68.11% Christianity out of 392,
  - 100% Others out of 1,

- 119 people are middle class having average exp. 93823.97,
  - 16.33% Hindu out of 49,
  - 25% Islam out of 8,
  - 27.55% Christianity out of 392,
  - 100% Buddhism out of 1,

- 19 people are upper class having average exp. 781289.00,
  - 2.04% Hindu out of 49,
  - 4.34% Christianity out of 392,
  - 100% Sikhism out of 1,

In State -14 total of 823 people, out of which
- 818 people are poor class having average exp. 25647.72,
  - 99.32% Hindu out of 443,
  - 97.50% Islam out of 40,
  - 99.66% Christianity out of 298,
  - 100% Others out of 42,

- 4 people are middle class having average exp. 265114.25,
  - 0.68% Hindu out of 443,
  - 2.50% Islam out of 40,

- 1 people are upper class having average exp. 807454.00,
  - 0.34% Christianity out of 298,

In State -15 total of 604 people, out of which
- 483 people are poor class having average exp. 35826.96,
  - 78.57% Hindu out of 14,
  - 100% Islam out of 4,
  - 79.44% Christianity out of 574,
  - 100% Buddhism out of 12,

- 111 people are middle class having average exp. 101457.61,

- ➢ 21.43% Hindu out of 14,
- ➢ 18.82% Christianity out of 574,

- • 10 people are upper class having average exp. 234642.80,
  - ➢ 1.74% Christianity out of 574,


In State -16 total of 1060 people, out of which
- • 984 people are poor class having average exp. 17194.47,
  - ➢ 92.75% Hindu out of 952,
  - ➢ 91.95% Islam out of 87,
  - ➢ 100% Christianity out of 5,
  - ➢ 100% Buddhism out of 16,

- • 69 people are middle class having average exp. 76283.68,
  - ➢ 6.62% Hindu out of 952,
  - ➢ 6.90% Islam out of 87,

- • 7 people are upper class having average exp. 197105.29,
  - ➢ 0.63% Hindu out of 952,
  - ➢ 1.15% Islam out of 87,


In State -17 total of 624 people, out of which
- • 425 people are poor class having average exp. 18388.13,
  - ➢ 52.43% Hindu out of 103,
  - ➢ 69.23% Islam out of 26,
  - ➢ 71.49% Christianity out of 477,
  - ➢ 68.75% Others out of 16,

- • 156 people are middle class having average exp. 49813.40,
  - ➢ 35.92% Hindu out of 103,
  - ➢ 19.23% Islam out of 26,
  - ➢ 22.64% Christianity out of 477,
  - ➢ 100% Sikhism out of 1,
  - ➢ 31.25% Others out of 16,

- • 43 people are upper class having average exp. 95550.47,
  - ➢ 11.65% Hindu out of 103,
  - ➢ 11.54% Islam out of 26,
  - ➢ 5.87% Christianity out of 477,


In State -18 total of 2089 people, out of which
- • 1894 people are poor class having average exp. 19523.22,
  - ➢ 90.33% Hindu out of 1551,

- ➢ 91.18% Islam out of 442,
- ➢ 94.38% Christianity out of 89,
- ➢ 75.00% Sikhism out of 4,
- ➢ 100% Others out of 3,

- • 192 people are middle class having average exp.  84807.84,
  - ➢ 9.48% Hindu out of 1551,
  - ➢ 8.82% Islam out of 442,
  - ➢ 5.62% Christianity out of 89,
  - ➢ 25.00% Sikhism out of 4,

- • 3 people are upper class having average exp.  801536.00,
  - ➢ 0.19% Hindu out of 1551,


In State -19 total of 5651 people, out of which
- • 5480 people are poor class having average exp.  23737.05,
  - ➢ 96.84% Hindu out of 4436,
  - ➢ 97.64% Islam out of 1142,
  - ➢ 94.74% Christianity out of 38,
  - ➢ 100% Sikhism out of 3,
  - ➢ 85.71% Jainism out of 7,
  - ➢ 90% Buddhism out of 10,
  - ➢ 100% Others out of 15,

- • 136 people are middle class having average exp.  187958.22,
  - ➢ 2.55% Hindu out of 4436,
  - ➢ 1.66% Islam out of 1142,
  - ➢ 5.26% Christianity out of 38,
  - ➢ 14.29% Jainism out of 7,

- • 35 people are upper class having average exp.  256734.80,
  - ➢ 0.61% Hindu out of 4436,
  - ➢ 0.70% Islam out of 1142,


In State -20 total of 1216 people, out of which
- • 1107 people are poor class having average exp.  20172.89,
  - ➢ 90.65% Hindu out of 963,
  - ➢ 91.71% Islam out of 193,
  - ➢ 96.77% Christianity out of 31,
  - ➢ 83.33% Sikhism out of 6,
  - ➢ 95.65% Others out of 23,

- • 108 people are middle class having average exp.  104867.66,
  - ➢ 9.24% Hindu out of 963,

- ➢ 8.29% Islam out of 193,
- ➢ 3.23% Christianity out of 31,
- ➢ 16.67% Sikhism out of 6,
- ➢ 4.35% Others out of 23,

- • 1 people are upper class having average exp.  999809.00,
  - ➢ 0.10% Hindu out of 963,

In State -21 total of 2628 people, out of which
- • 2502 people are poor class having average exp.  16193.18,
  - ➢ 95.20% Hindu out of 2521,
  - ➢ 91.94% Islam out of 62,
  - ➢ 100% Christianity out of 43,
  - ➢ 100% Sikhism out of 1,
  - ➢ 100% Others out of 1,

- • 90 people are middle class having average exp.  76145.54,
  - ➢ 3.49% Hindu out of 2521,
  - ➢ 3.23% Islam out of 62,

- • 36 people are upper class having average exp.  135607.92,
  - ➢ 1.31% Hindu out of 2521,
  - ➢ 4.84% Islam out of 62,

In State -22 total of 1282 people, out of which
- • 1085 people are poor class having average exp.  17612.08,
  - ➢ 85.28% Hindu out of 1175,
  - ➢ 88.37% Islam out of 43,
  - ➢ 87.50% Christianity out of 32,
  - ➢ 42.86% Sikhism out of 7,
  - ➢ 30.77% Jainism out of 13,
  - ➢ 80% Buddhism out of 10,
  - ➢ 100% Others out of 2,

- • 181 people are middle class having average exp.  76510.13,
  - ➢ 13.70% Hindu out of 1175,
  - ➢ 9.30% Islam out of 43,
  - ➢ 9.38% Christianity out of 32,
  - ➢ 57.14% out of 7,
  - ➢ 53.85% Jainism out of 13,
  - ➢ 20% Buddhism out of 10,

- 16 people are upper class having average exp. 271651.38,
  - 1.02% Hindu out of 1175,
  - 2.33% Islam out of 43,
  - 3.13% Christianity out of 32,
  - 15.38% Jainism out of 13,

In State -23 total of 2678 people, out of which
- 2515 people are poor class having average exp. 25489.26,
  - 94.47% Hindu out of 2332,
  - 93.08% Islam out of 260,
  - 94.44% Christianity out of 18,
  - 44.44% Sikhism out of 9,
  - 83.33% Jainism out of 54,
  - 100% Buddhism out of 4,

- 162 people are middle class having average exp. 164129.84,
  - 5.49% Hindu out of 2332,
  - 6.92% Islam out of 260,
  - 5.56% Christianity out of 18,
  - 55.56% Sikhism out of 9,
  - 16.67% Jainism out of 54,
  - 100%Zoroastrianism out of 1,

- 1 people are upper class having average exp. 2425513.00,
  - 0.04% Hindu out of 2332,

In State -24 total of 2570 people, out of which
- 2500 people are poor class having average exp. 32825.31,
  - 97.33% Hindu out of 2244,
  - 98.00% Islam out of 250,
  - 100% Christianity out of 20,
  - 90.91% Sikhism out of 11,
  - 92.50% Jainism out of 40,
  - 100% Buddhism out of 1,
  - 66.67%Zoroastriani out of 3,
  - 100% Others out of 1,

- 68 people are middle class having average exp. 269125.56,
  - 2.58% Hindu out of 2244,
  - 2.00% Islam out of 250,
  - 5.56% Christianity out of 18,
  - 9.09% Sikhism out of 11,

- ➢ 7.50% Jainism out of 40,
- ➢ 33.33%Zoroastrianism out of 3,

- • 2 people are upper class having average exp. 1477857.00,
  - ➢ 0.09% Hindu out of 2244,

In State -25 total of 120 people, out of which
- • 198 people are poor class having average exp. 29363.52,
  - ➢ 81.13% Hindu out of 106,
  - ➢ 81.82% Islam out of 11,
  - ➢ 100% Christianity out of 3,

- • 14 people are middle class having average exp. 91155.14,
  - ➢ 11.32% Hindu out of 106,
  - ➢ 18.18% Islam out of 11,

- • 8 people are upper class having average exp. 108921.38,
  - ➢ 7.55% Hindu out of 106,

In State -26 total of 131 people, out of which
- • 109 people are poor class having average exp. 27936.83,
  - ➢ 84.75% Hindu out of 118,
  - ➢ 62.50% Islam out of 8,
  - ➢ 80.00% Christianity out of 5,

- • 17 people are middle class having average exp. 96165.47,
  - ➢ 11.86% Hindu out of 118,
  - ➢ 25.00% Islam out of 8,
  - ➢ 20.00% Christianity out of 5,

- • 5 people are upper class having average exp. 175682.20,
  - ➢ 3.39% Hindu out of 118,
  - ➢ 12.50% Islam out of 8,

In State -27 total of 5040 people, out of which
- • 4692 people are poor class having average exp. 29978.83,
  - ➢ 92.89% Hindu out of 3978,
  - ➢ 95.75% Islam out of 635,
  - ➢ 89.58% Christianity out of 96,
  - ➢ 91.30% Sikhism out of 23,
  - ➢ 88.10% Jainism out of 84,
  - ➢ 93.68% Buddhism out of 190,
  - ➢ 88.24% Zoroastrianism out of 17,

➢ 88.24% Others out of 17,

- 319 people are middle class having average exp. 177064.69
  ➢ 6.51% Hindu out of 3978,
  ➢ 4.09% Islam out of 635,
  ➢ 8.33% Christianity out of 96,
  ➢ 4.35% Sikhism out of 23,
  ➢ 10.71% Jainism out of 84,
  ➢ 6.32% Buddhism out of 190,
  ➢ 11.76% Zoroastrianism out of 17,
  ➢ 11.76% Others out of 17,

- 29 people are upper class having average exp. 421813.21,
  ➢ 0.60% Hindu out of 3978,
  ➢ 0.16% Islam out of 635,
  ➢ 2.08% Christianity out of 96,
  ➢ 4.35% Sikhism out of 23,
  ➢ 1.19% Jainism out of 84,


In State -28 total of 5635 people, out of which
- 5402 people are poor class having average exp. 22197.84,
  ➢ 95.97% Hindu out of 4985,
  ➢ 95.99% Islam out of 499,
  ➢ 94.33% Christianity out of 141,
  ➢ 100% Sikhism out of 1,
  ➢ 33.33% Jainism out of 6,
  ➢ 100% Buddhism out of 1,
  ➢ 100% Others out of 2,

- 230 people are middle class having average exp. 194290.47
  ➢ 3.97% Hindu out of 4985,
  ➢ 4.01% Islam out of 499,
  ➢ 5.67% Christianity out of 141,
  ➢ 66.67% Jainism out of 6,

- 3 people are upper class having average exp. 2725733.20,
  ➢ 0.06% Hindu out of 4985,


In State -29 total of 3013 people, out of which
- 2840 people are poor class having average exp. 21032.35,
  ➢ 94.44% Hindu out of 2590,
  ➢ 94.01% Islam out of 334,
  ➢ 92.06% Christianity out of 63,
  ➢ 100% Sikhism out of 1,

- ➢ 85.00% Jainism out of 20,
- ➢ 100% Buddhism out of 1,
- ➢ 75.00% Others out of 4,

- 170 people are middle class having average exp.  138712.86
  - ➢ 5.44% Hindu out of 2590,
  - ➢ 5.99% Islam out of 334,
  - ➢ 7.94% Christianity out of 63,
  - ➢ 15.00% Jainism out of 20,
  - ➢ 25.00% Others out of 4,

- 3 people are upper class having average exp.  2725733.20,
  - ➢ 0.12% Hindu out of 2590,

In State -30 total of 191 people, out of which
- 151 people are poor class having average exp.  28534.55,
  - ➢ 83.49% Hindu out of 109,
  - ➢ 100% Islam out of 9,
  - ➢ 69.86% Christianity out of 73,

- 36 people are middle class having average exp.  97537.36,
  - ➢ 14.68% Hindu out of 109,
  - ➢ 27.40% Christianity out of 73,

- 3 people are upper class having average exp.  299119.50,
  - ➢ 1.83% Hindu out of 109,
  - ➢ 2.74% Christianity out of 73,

In State -31 total of 64 people, out of which
- 53 people are poor class having average exp.  29443.49,
  - ➢ 85.71% Hindu out of 7,
  - ➢ 83.93% Islam out of 56,

- 10 people are middle class having average exp.  107711.80
  - ➢ 14.29% Hindu out of 7,
  - ➢ 14.29% Islam out of 56,
  - ➢ 100% Christianity out of 1,

- 1 people are upper class having average exp.  474237.00,
  - ➢ 1.79% Christianity out of 56

In State -32 total of 3132 people, out of which
- 2977 people are poor class having average exp.  40259.16,
  - 95.57% Hindu out of 1805,
  - 94.13% Islam out of 715,
  - 94.60% Christianity out of 611,
  - 100% Others out of 1,

- 125 people are middle class having average exp.  278692.75
  - 3.49% Hindu out of 1805,
  - 4.76% Islam out of 715,
  - 4.58% Christianity out of 611,

- 30 people are upper class having average exp.  1126021.07,
  - 0.94% Hindu out of 1805,
  - 1.12% Islam out of 715,
  - 0.82% Christianity out of 611,


In State -33 total of 5226 people, out of which
- 4995 people are poor class having average exp.  22043.44,
  - 95.70% Hindu out of 4626,
  - 96.10% Islam out of 308,
  - 93.40% Christianity out of 288,

- 176 people are middle class having average exp.  147153.69,
  - 3.24% Hindu out of 4626,
  - 2.92% Islam out of 308,
  - 5.56% Christianity out of 288,
  - 100% Sikhism out of 1,

- 55 people are upper class having average exp.  240575.85,
  - 1.06% Hindu out of 4626,
  - 0.97% Islam out of 308,
  - 1.04% Christianity out of 288,


In State -34 total of 216 people, out of which
- 205 people are poor class having average exp.  34162.88,
  - 94.90% Hindu out of 196,
  - 93.33% Islam out of 15,
  - 100% Christianity out of 5,

- 7 people are middle class having average exp.  193686.86,
  - 3.06% Hindu out of 196,
  - 6.67% Islam out of 15,

- 4 people are upper class having average exp. 324462.50,
  - 2.04% Hindu out of 196,

In State -35 total of 251 people, out of which
- 202 people are poor class having average exp. 30469.53,
  - 82.18% Hindu out of 174,
  - 60.71% Islam out of 28,
  - 87.23% Christianity out of 47,
  - 50% Sikhism out of 2,

- 39 people are middle class having average exp. 125896.74,
  - 13.79% Hindu out of 174,
  - 39.29% Islam out of 28,
  - 6.38% Christianity out of 47,
  - 50% Sikhism out of 2,

- 10 people are upper class having average exp. 313433.10,
  - 4.02% Hindu out of 174,
  - 6.38% Christianity out of 47,

## Conclusions

A detailed study has been undertaken for Poverty Mapping in Indian States using clustering which is a data mining technique. Poverty mapping has been done region and religion wise. This will definitely help the Government to take necessary steps to alleviate poverty in different states.